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**AMERICAN FIGHTER COMBAT DURING WWI—
HOW SIGNIFICANT WAS AMERICA'S LATE ENTRY?**

A Research Paper

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by

Major Terrance W. Sando

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Preface

This research paper could not have been written without the help of Dr. Mike Grumelli. His class on airpower during World War I helped to pave the way for research on American Fighter Combat. His thoughtful insight and helpful suggestions were deeply appreciated.

The Air University Library gets my endless thanks for their courtesies and valuable assistance. The library personnel were always there to answer all my questions and help with suggestions.

Finally, my thanks are extended to the United States Air Force for giving me the opportunity to attend Air Command and Staff College. This sabbatical has allowed me to do research and expand my air power horizons.

Abstract

It has been over three quarters of a century since the American Air Service began operations in Europe during the Great War. Its service there during the final days of World War I, except for a few volunteers, only covered seven short months. Even though war was declared a year earlier in the spring of 1917, it took a year to get a force organized for air combat in Europe. But, finally, high above the ruined landscape of the trench warfare, American airpower made its debut. It was here that America's young warriors without parachutes and in bitter cold open cockpits made their contributions. Their battles took place high over Toul, Chateau-Thierry, St. Mihiel, and the Meuse-Argonne. I will examine training, leadership, and the adaptation of formation tactics of the infant United States air arm. You will see that as a combat force, the Air Service made tremendous strides from its cautious beginnings in April 1918. At this time the force only consisted of a single observation squadron flying obsolete aircraft and two pursuit units flying unarmed Nieuports. By July and August the American force had grown to seven squadron's when they were thrown into the bloody battles around Chateau-Thierry. Here they flew against some of the best Jagdstaffeln in the German Air Force. Even though their experience was bloody it produced a hard core of veterans who had learned the lessons of aerial warfare well. This core then became the leadership that acted as examples to be emulated for the coming autumn campaigns. Eventually twenty-six American squadrons followed these veterans into battle. Their stability and leadership

allowed large formations of American aircraft to wrestle the air away from the Germans. In the rain and mud of the Meuse-Argonne offensive, the American Air Service proved worthy of their opponents in every way. Although American forces never had more than forty-five squadrons in combat, with many of these only in the final weeks of the war, they did establish a legacy. They did this with a tradition of raw courage and persistence which has been carried on to the present day.

Chapter 1

Background

The most important branch of aviation is pursuit, which fights for and gains control of the air.

—Brig. General William “Billy” Mitchell, USAS

Thesis Statement and Research Scope

The development of air power constitutes one of the most dramatic technological advances of the twentieth century. This competition for leadership in the air has not only been between men, but also between nations. The process has been fascinating and evolutionary. Nations have concentrated great human effort and capital to attain the status of an aerial power.

The greatest strides in air power have come during periods of wartime. The concept of air combat was incubated in the early stages of the First World War. At the beginning of the war in 1914, few people had any idea that pilots or air units would exert much influence on land battles, much less the outcome of the war. Only a few perceptive observers of events began to realize the tremendous potential of air power. Initially the airplane was used for observation and reconnaissance. Aircraft were well established in this role before being adapted to aerial combat. The struggle between individual pilots to win superiority in the air during World War I greatly influenced the growth of military air

power. Air combat moved from a novelty in the beginning, to a necessity at the end of the war.

How significant was the contribution that America made to military air power in World War I? Our late entry precluded the leadership role in airpower. Many different circumstances prevented the United States from preparing for war, this was especially true in the air arena. Initially, we relied heavily on our Allies for support and equipment. But I will present an assessment that Americans did make major contributions. Three categories were greatly influenced by the air service of the American Expeditionary Force. There were training, leadership, and force concentration. Due to the large amount of material I will focus on American fighter operations during the final stages of the war.

The war in the air was a major influence on our pilots and planners, it molded their thoughts on airpower. How they were able to adapt and overcome the handicap of our late entry and lack of equipment was a tribute to American flexibility. Their early experience in fighter combat set the precedence for the future.

Development of Airpower during World War I

Powered aircraft were first used in war in 1911. The Italian's employed airpower against the Turks near Tripoli. They used both aircraft and airships, some were fitted with bomb releases. It wasn't until the Great War of 1914 - 1918 that aerial combat began.

It was high above the trench warfare, away from the mass murder, the mud, and the reek of the battlefield, that this new type of warfare came into being. Airmen, ever inventive and taking advantage of technical advances, adapted the airplane as an efficient means of killing fellow airmen. This fighting in the air was individual combat, man against

man, and machine against machine. It was glamorous and likened to the days of chivalry of an earlier period. A time when knights mounted on their steeds, did individual combat. This was in marked contrast to the infantryman of World War I who was usually up to his ankles in mud, sharing their trenches with rats, and seeing their comrades blown to pieces by high explosive shells fired with impartiality from many miles away. It was this stark contrast and the need for national heroes that prompted the attention that this new aerial warfare was given. These fighter pilots were relatively young, and thus little war guilt and militarism were associated with them. World War I pilots became the new knights. Each countries news media painted them as national heroes. Death in the air when it came, was quick, spectacular to the observer and very personal. It was the fighter pilot who shot down the greatest number of their countries opponents who were idolized. The most successful became known to millions, even in the countries of their enemies.¹ Their aerial exploits even gained the respect of opposing pilots. Even history has treated these aces with respect. A good example is Baron Manfred von Richthofen, the Red Baron, who is still world famous even though he died in 1918.² Whatever the reason for their popularity and fame, these aerial warriors made very important contributions to their respective countries' war efforts.

At the outbreak of the First World War in 1914, few in the military hierarchy had any idea that pilots or air units would exert much influence on land battles. Soon perceptive pilots, and other observers of events, began to realize the tremendous potential of air power. Early in the war the aircraft were unarmed and employed for reconnaissance. They were treated as an extension of the eyes of the ground commander. Practically all aircraft in existence at the beginning of the First World War were two-seaters, designed

more as stable observation machines than air combat aircraft. It wasn't long before the need to deny reconnaissance information to the enemy led to air-to-air combat. This pushed each side to try to gain superiority in the air. The early attempts at aerial combat were crude at best. More often resembling duels instead of battles. These opening encounters had the airman employing pistols or rifles against each other in the air. The next step was to arm aircraft with machine guns. The French took the lead by defining the role of the fighter plane and also the type of attributes that it needed. This was all accomplished in the first six months of the war.

Soon, however the aerial duels of the day led to air-to-air combat. The big breakthrough came when fighter planes were armed with fixed, forward-firing machine guns. This provided the pilot with the ability to aim his entire aircraft at the enemy. Because of this, maneuvering relative to another aircraft is much simpler, just keep the opponent in front of the plane. The fact that the effective range of their early weapons was only about 200 yards, meant that the first aerial combat took place at very short range. Roland Garros, a French pilot was the first to address the problem of firing through the propeller of a single-engine tractor aircraft. He attached steel deflector plates to the backside of the propeller, and mounted an automatic rifle in front of the cockpit. When he fired, bullets that didn't go through the propeller arc (about 1 in 10), simply ricocheted off the angled steel plates.³ With this invention, Garros was able to shoot down three enemy airplanes and force two to land. This earned him the title of ace. Ace is a French slang term denoting an outstanding performer in any field. An Allied journalist, hearing of Garros' five victories and references to him as an "ace," interpreted the term to mean a pilot with five scores. In his news stories, he reported that five scores were required to become an

ace. The misinterpretation that five scores qualified a pilot as an ace spread and later became the accepted criteria.⁴ Garros continued to terrorize the skies with his front-firing gun. In April of 1915, engine trouble forced him down behind German lines. His aircraft was captured before he could destroy it. When the Germans saw his aircraft, the secret of his deflector device was out. The propeller with the deflector plate was shown to Anthony Fokker. He was told to produce a system that would be as good or better. Fokker developed a synchronizer (an interrupter system), a mechanical system that prevented the gun from firing until the propeller was safely out of the way. This device while not entirely free of problems, was considered a great success. More importantly, it set the stage for the advent of other aces and the Fokker scourge.

By the second year of the war, fighter tactics emerged on both sides emphasizing basic concepts. The first of three new concepts was air superiority. Pilots attempted to control the skies by jumping or bouncing unsuspecting victims. Many high-scoring First World War aces perfected methods of sneaking up unobserved for first pass victories. Many more kills were acquired this way than were gotten in the spectacular aerobatics of dogfighting. The pilot's only warning system against attacking fighters was the naked eye. Whenever possible pilots attempted to approach from the rear or dive out of the sun where they couldn't be seen. The next role for aircraft was ground attack. This direct support of ground forces presented many dangers to the pilots. The planes by strafing and dropping bombs could aid an advance, cover a retreat, or simply harass enemy movements. Finally, in the later stages of the war we see the use of strategic bombing. Even though in the early stages of development, it was used to attack transportation and supply networks in the rear areas. We can see the evolution of the airplane in World War

I by looking at its roles: reconnaissance, air superiority, tactical ground support, and strategic bombing.

Review of the Related Literature

The thesis of this research project is predicated on the following premise: **America did make a contribution to airpower in its short involvement in the Great War.** These were in the areas of training, leadership, and force concentration. The literature supporting this premise is quite broad, ranging from biographies, unit histories, short articles, to books covering the history of World War I. The Air University Library and the United States Air Force Historical Research Center have been great resources for materials relating to this subject. Research and study of airpower during the First World War has not been given the scrutiny that other wars have received. The vogue has been on the use of airpower verses the origination and development of airpower. Because of this, World War II and modern day warfare tend to get more exposure.

The best sources are first and second hand accounts by military members who were involved directly with the development of aircraft and airpower in World War I. These accounts can be in many different forms: combat reports, diaries, records, or other documents. Books covering the development of airpower and the history of the era are also good sources. The body of related literature continues to increase. Two good examples are *Hostile Skies* by James Hudson and *The First Air War* by Lee Kennett. These are well researched and written books that consolidate much of the relevant work into one source.

History contains many invaluable lessons concerning airpower. One must look to the past in order to draw relevance for the present and inspiration for the future. As I proceed with this paper, remember that the challenges encountered during the early phases of airpower development may provide answers for the transition to an air and space power in today's world.

Overview

This research project will review the contributions that America made to airpower in the final days of World War I. Except for a few volunteers, the history of actual combat of the American Air Service covered only seven short months. Had the war lasted a few more months, the Air Service likely would have reached the awesome potential that advocates had predicted in the spring of 1917. Although our Air Service never had more than forty-five squadrons in combat, and this many only during the last few weeks of the war, it did establish a tradition of courage and persistence that has carried on to the present day.

Notes

¹Ernest Wilhelm von Hoeppner, *Germany's War in the Air*, (Leipsig: A.F. Koehler, 1921), 72.

²William E. Burrows, *Richthofen*, (New York: Harcourt, Brace and World, Inc., 1969), XI & XII.

³Lee Kennett, *The First Air War*, (New York: The Free Press, 1991), 69.

⁴Robert E. Cunningham, *Aces High*, 3rd ed. (Fort Worth, Texas: General Dynamics, 1989), 3.

Chapter 2

Training

In my opinion the aggressive spirit is everything.

—Baron Manfred von Richthofen

Was America Ready

To set the stage, we must remember that America was not well prepared for the war that was to end all wars. On 6 April 1917, there wasn't a single air unit trained for warfare. The Aviation Section of the Signal Corp didn't have a single combat-type plane. No one then serving in the American military forces had actual combat flying experience. The Army had 55 trainers operating at two flying fields. One has to wonder about this amazing lack of preparedness, especially when considering the fact that the war in Europe had been going on for almost three years. Even though President Woodrow Wilson had been elected with a platform of keeping America out of the War in 1916, the mood of the country was changing. Certainly, many political and military leaders in the United States must have anticipated the possibility of war, yet the entire Aviation Section contained only 131 officers, mainly pilots and student pilots, and 1,087 enlisted men in April, 1917. Only 26 officers were considered fully trained, bearing the rating of Junior Military Aviator.¹ To compound the problem of not having a viable air arm, was the fact that there wasn't any plans or programs for building a strong air arm. During our period of neutrality the

US had failed to send trained observers to the war zones. This failure to collect technical and operational information hampered our ability to rapidly provide an air option for the war effort. America would go through a year of catch-up before an adequate force could be fielded. Much of the blame falls on the failure of Congress in the preceding years to appropriate money for military aeronautics. This was the principle reason for the lack of planes and manpower. The military establishment on the other hand must shoulder the responsibility for the lack of realistic plans for the expansion of the American Air Service.

Initially, aviation was given a comparatively insignificant role in the mobilization for World War I. Prompting from Britain and France helped to overcome this initial inertia. Both nations sent well staffed missions to appeal for full participation on the front lines. Members of these delegations argued that the United States could effectively help the Allied effort in a number of ways. One key way would be sending a powerful air force to the western front that could participate in the 1918 campaign. Another significant factor at about this time was the travel of Lt Col William Mitchell to France just before America declared war on Germany. His two month interval between the declaration of war and the arrival of the lead elements of the American Expeditionary Force (AEF) were spent conferring with British and French aviation authorities. He also took the opportunity to experience the war in the trenches first hand. It was from this exposure that he began to synthesize his ideas on aerial warfare. During this period, he used the influence that he had cultivated with the French to stimulate the growth of the American Air Service in the Washington political arena. He collaborated with the staff of the Army Group of the Northeast on a letter to the French Minister of War suggesting that the United States be requested to undertake a gigantic aviation buildup with emphasis on a force for strategic

operations of some thirty pursuit and bomber groups. The letter appears in turn to have been the basis for a message from Prime Minister Ribot to the United States—the famous "Ribot Cable." This message reached a Washington uncertain about what to do in the way of an aviation program. American officialdom eagerly seized upon the 4,500 plane total suggested in the message as the basis for a \$640,000,000 aircraft production program which Congress speedily authorized.² Imbedded in the message, was also a request for 5,000 pilots and 50,000 mechanics.

With the battle for the appropriation of money won, the problem of converting funds into trained manpower, squadrons, planes, and equipment had begun. In August (1917), aviation leaders received approval to raise 345 combat squadrons, 81 supply squadrons, 11 repair squadrons, 45 construction companies, and 26 balloon companies. Of these, 263 combat squadrons were scheduled for use in Europe by 30 June 1918. These plans may have looked good on the Aviation Section's wall charts, but it was soon discovered that no amount of money would buy time.³ One of the main hurdles was how to get the training done.

Expansion of Ground and Primary Training

With the media heralding the exploits of the aces on the western front, it was easy to fire the imagination's of American youth. Many were volunteering for flight training with the Army and Navy during the initial months of the war. Despite a large reservoir of manpower, the Air Service had serious training problems. This was mainly due to limited training aircraft and facilities. It was obvious from the beginning that most of the training would have to take place in the United States. With its tiny force of 1,200 officers and

enlisted men and its three flying fields—at San Diego, California; Mineola, Long Island; and Essington, Pennsylvania—the Army’s air arm began an ambitious expansion program in April 1917. In the next nineteen months, the Air Service was to increase 150 fold.⁴ A decision was made to standardize the training. The prewar highly personalized style would not be conducive to training the thousands of pilots needed. Much like the training of today, plans called for a three-phase program—ground, primary, and advanced. To coordinate the program, Dr. Hiram Bingham, a Yale University history professor, was commissioned into the Signal Corps. As a major, he was placed in charge of all United States Schools of Aeronautics.

Because of his background in academia, Major Bingham established ground schools for flying cadets at six educational institutions. These schools were the universities of California, Texas, Illinois, Ohio State, and Cornell University and the Massachusetts Institute of Technology. Two schools were added later, Princeton and Georgia Tech. This program which lasted until a few weeks after the Armistice, received 22,689 cadets and graduated 17,540.

The ground school lasted from eight to twelve weeks. The flight cadets received basic instruction in the principles and theory of flight, radio, codes, photography, the operation and maintenance of aircraft engines, machines guns, and the care of the airframe itself. They learned how to interact with the infantry, artillery, and the basics of officer responsibilities. Throw in the usual drill and calisthenics to round out the days which began at 5:30 AM and ended at 9:30 PM.

Because there were only three flight training facilities, the primary flight training program was unable to keep pace with the ground school expansion. The problem was

complicated by the fact that it took months to select and construct new sites. The U. S. looked to Canada for help. Canada agreed to provide flying facilities during the summer months of 1917. In return, Canada could use the new American fields during the winter. Their arrangement allowed several hundred Americans to start their primary flight training before the completion of the air field expansion. By the end of the war there existed a total of twenty-seven flying fields in the United States and another sixteen in Europe.

During the flying cadets six to eight week stay at primary flight school they received between 40 to 50 hours of flying training. At the conclusion of this period of instruction the cadet was given the Reserve Military Aviation (RMA) test. The typical RMA test consisted of the following: (1) Climb out of a field 2,000 feet square and attain 500 feet altitude, keeping all parts of the machine inside the square during climb. (2) Glide at normal angle, with motor throttled. Spiral to the right and left. Change of direction in gliding. (3) At 1,000 feet cut off motor and land within 200 feet of a previously designated point. (4) Land over an assumed obstacle 10 feet high and come to a rest within 1,500 feet of the same. (5) Cross-country triangular flight of 30 miles, passing over two previously designated points. Minimum altitude 2,500 feet. (6) Straight-away cross-country flight of 30 miles. Landing to be made at a designated destination. Both outward and return flights at minimum altitude of 2,500 feet. (7) Fly for 45 minutes at an altitude of 4,000 feet.⁵ After successfully completing the test, the cadet was commissioned a lieutenant. 8,688 out of approximately 15,000 cadets received their RMA ratings. Another 2,000 were trained at overseas schools, making a total of more than 10,000 American pilots trained during the war.⁶

The primary flying training that took place in Europe, was done by both the British and the French, along with a few American pilots who had been flying voluntarily for them. The Italians also helped with primary training to a much lesser extent. Each nation had their own way of accomplishing the training. The French system was based on the student mastering the art of flying by progressively graduating to more demanding aircraft after demonstrating proficiency in an earlier model. The training began in Penguin planes with the wings clipped so that they wouldn't fly. Ultimately, the pilot graduated to a pursuit aircraft. The downside to the French system was that it usually required a long period of time to turn out a trained pilot with this method of gradual progression. The training in England was quite different. The English concentrated on faster training even at the expense of greater casualties. Thirty-four Americans were killed in England during flight training.⁷ The Farman was used as the primary trainer. The British system did use a unique training device called the Gosport method. It was a speaking tube connecting the instructor with the student. It proved to be a valuable teaching aid for helping the student.

Advanced Flight Training

The main advanced flying school was located in Issoudun, France. The French provided many of the instructors for the advanced phases of training. These were veteran fliers just back from combat tours at the front. The Aviation Instruction Center, (AIC) at Issoudun was one of nine AIC's established by the Americans to provide advanced and specialized training. Each of the nine tended to specialize in one phase of the instruction program. Pursuit instruction and all pursuit training except aerial gunnery was done there. The cadets had usually been commissioned as officers at this point. They were drilled in

acrobatics, formation flying, and simulated combat. Camera guns took the place of the real guns. The trainees were provided with realistic training, they were frequently challenged in mock dogfights by their combat-hardened instructors. Their intense training environment saved many lives at the front later on. The downside was that the fatality rate in pursuit training was high. The violent acrobatic action in the tiny high-powered fighters produced one fatality for each 9.2 graduations as compared with one in 50 for both observation and bombardment.⁸ The American schools took the best of all the Allied training systems and molded them into their program of instruction. The result was a system of instruction that produced well adapted airman capable of meeting the challenges of aerial combat. The most important aspect for the war effort was America's ability to standardize training procedures. This allowed the Air Service to expand at a rapid rate. This manifested itself by the large numbers America could put against the Germans in the later part of 1918. Ultimately proving to them that the war was lost.

Notes

¹Alfred Goldberg, *A History of the United States Air Force, 1907 - 1957*, (Princeton: D. Van Nostrand Co., 1957), 13.

²Alfred F. Hurley, *Aeronautical Ideas of General William Mitchell* (Ann Arbor: University Microfilms, Inc., 1961), 36.

³James J. Hudson, *Hostile Skies*, (Syracuse: Syracuse University Press, 1996), 6.

⁴"The Men and the Machines, Part IV - World War I, Early Phases," *Air Power Historian*, IV (October, 1957), 200.

⁵Henry Woodhouse, *Textbook of Military Aeronautics*, (New York: Century Co., 1918), 189.

⁶E. S. Gorrell, *The Measure of Ameria's War Aeronautical Effort*, (Northfield, Vt: Norwich University, 1940), 14 - 23.

⁷Hudson, *Hostile Skies*, 33.

⁸Ibid., p. 35 & 36.

Chapter 3

Leadership

The air man's psychology of war depends on the action of the individual, he has no man at his elbow to support him; no officers in front to lead him, and no file closer behind him to shoot him if he runs away as in the case in a ground army. The whole system is entirely different from that of troops on the ground where mob psychology has to be used in directing the men in combat.

—Brig. General William “Billy” Mitchell, USAS

Individual Personality

Air combat is a fast-moving and fluid form of warfare. It is quite complex, stemming from the fact that it operates in three dimensions rather than two. Aerial combat during World War I evolved from the lone predator to large formations. Towards the end of the war the fighting in the air was based on teamwork. The men who wrote the book on this new type of warfare came from many varied backgrounds. The quality of these individuals varies greatly.

Leaders and leadership are subjects that are constantly alluded to in aerial warfare. A good leader in a unit can have an effect out of proportion to the sum of its parts. They can weld many individuals into a cohesive fighting unit. Their main contribution, besides helping with flight proficiency and tactics, is to improve morale. Even if he is unable to

dispel Clausewitz's fog of war, a good leader will rally his flyer and guide them through unfavorable situations.

It can be argued that German leadership in the air war was better than that of the Allies, at least at the fighting unit level. The Germans tended to take less risks than their counterparts. They tended not to romanticize it, but instead tie it with military objectives. Their side also produced the great tactician of the war, Hauptmann Oswald Boelcke. He wrote the first manual for fighter pilots, and did the planning for reorganization of the German Air Force in 1916. He has gone down as the father of air fighting. It was Boelcke's influence that pervaded the German fighter arm throughout World War I. As the leader of Jagdstaffel 2, one of the first pure fighter units, he personally selected and trained his pilots. His most famous pupil was Manfred von Richthofen, the Red Baron. It must be remembered that when Boelcke's fighting career started, combat between aircraft was haphazard, but less than eighteen months later, because of his influence, it had evolved into a systematic approach. (See Boelcke's *Dicta* appendix A, page 28.) The result was the transformation of fighter combat into a professional activity rather than a sporting pursuit. During the early days, two entirely different sorts of successful pilots emerged. One typified the rational thinker and innovator, the other impetuous loners always looking for a fight. This began to change in 1916 with the introduction of fighting formations by the Germans. This forced the British and French to do the same. Force had to be met with force, number with number. Most commanders realized that the new philosophy that needed to be adopted, was of doing the most damage with the least casualties. It was now up to the leader on the employment of large formations. Should they be used as a fighting team throughout an engagement, or as a convenient method of

getting large numbers to the fight and then breaking up into individual fights. As formations grew, tactics began to play a greater role. It also demanded more of the formation leader.

This was the foundation for the environment in which the Americans began their operations in 1918. It must also be remembered that the Germans were no longer fighting a two front war. The Russian revolution allowed them to concentrate their forces on the western front.

Much has been written about the flyer's individualism. A good example is Richthofen's Albatros that was painted solid red, giving rise to the title, Red Baron.¹ The Americans in the early stages of participation tended to be lone eagles, or fight in pairs. Lieutenant Frank Luke is a good example. Frank Luke was never popular with his fellow pilots who considered him a braggart. He was contemptuous of authority and made only one good friend among his squadron mates, Joseph Fritz Wehner. On September 18, 1918 they took off to destroy balloons at the front. Most pilots tried to avoid balloons because of the formidable defenses associated with them. Luke and Wehner found it a challenge and made a career of it. At this point they had only been flying together for a month. That day Luke downed three airplanes and two balloons, unfortunately Wehner was killed while flying cover. Wehner's combat experience was measured in weeks, but he had accounted for four aircraft and four balloons. After his friend's death, Luke continued his war on balloons alone. He made his last flight on September 28th when he was killed after landing behind German lines. He had destroyed 18 balloons and aircraft in only two months at the front. Another loner initially was Captain Edward V. Rickenbacker, who learned the intricacy of pursuit aviation from Major Raoul Lufbery

who transferred to the Air Service from the Lafayette Escadrille. A good example of these individual sorties is a flight made shortly after Lufbery's instruction. On my second flight I trusted my judgment instead of my compass and wound up flying in the wrong direction. Then I jumped a French Spade and had to put my little ship through some tricky maneuvers, in order to show its pilot my United States markings before he could shot me down. In the air one shot first and identified later.² The fact that the Americans were flying alone or in pairs, instead of formation early on can be attributed to a number of things. Mainly, during the early stages, there weren't enough trained personnel and equipment for the concentration of forces. Another factor was the exuberance of our pilots having entered the war late. To them it was still an adventure.

Leading by Example

The two major functions of military leadership are organizing forces for conflict and then leading them in battle. Rickenbacker, the American Ace of Aces, was named commander of the 94th Hat-in-the-Ring Squadron. This fighting squadron had seen the service of many of the great pilots of World War I; Raoul Lufbery, Jimmy Hall, Dave Peterson, Doug Campbell, and Walter Smyth. Rickenbacker was considered an old head by this time, and he had developed a leadership style that helped the 94th achieve its great success. "I assured my pilots that I would be a flying leader, a fighting leader. I would never ask anyone to fly a mission that I would not fly. When the request came down from headquarters for volunteers to fly a hazardous mission, I would be the first to volunteer, and only then would I ask others to join me. I gave them my assurance, proved on many missions as a flight leader, that I would never turn back from a mission but would lead

them into combat and stick with them.”³ Rickenbacker brought a very competitive spirit with him to the Great War, it was developed during childhood and his days as a race car driver before the war. He didn’t like to come in second in anything. He was also a team player, this also stems from his days on the racetrack. His first act as commander was to call his pilots together, he then informed them what he expected of them. He learned from his early experiences in the cockpit and combat that fear and death were a part of air combat. This made him realize that not all men were up to combat, that their fear had gotten the best of them. “It may seem strange that a man who had gone through flight training and had flown patrols in wartime would be leery of combat. Fighting, however, requires a different kind of bravery from that involved in flying. The combat pilot must be mentally prepared to shoot to kill and to be shot at in return. Some pilots had sufficient motivation and bravery to learn to fly, but going out to kill or be killed over the lines required a different type of courage. Some did not have it.”⁴ As a leader he realized the importance of removing these individuals from the squadron, sending them to the rear echelon units in order not to harm the morale at the front. It wasn’t just Captain Rickenbacker that portrayed these traits of leading by example. These leadership traits were sought after by superiors who wanted results oriented individuals for command positions. Even Colonel Billy Mitchell was known to work harder and longer hours than his aides and subordinates. He also lead by example. “Mitchell never asked his men to do anything which he would not undertake to do himself.”⁵

In air combat there is a truism, for every victory there is a victim. A tiny minority ran up the score of aerial kills in World War I. These were the aces. Was it high quality training that allowed them to get more out of their aircraft? Maybe, but more then

anything else it was the leadership that seems to have had a far greater effect. It was particularly noticeable in units like Rickenbacker's that produced more than their share of pilots with high scores. Another benefit of these well lead units was the emphasis put on keeping the novices out of disadvantageous situations until they had gained experience. The better leaders tried to instill the basic principles of air combat into their followers. This development of situational awareness helped the American fighter pilots to overcome the odds in 1918.

Notes

¹Manfred Freiherr von Richthofen, *The Red Baron*, Peter Kilduff, trans., (New York: Air Combat Classics, Doubleday and Company, 1969), 121 - 122.

²Edward V. Rickenbacker, *Rickenbacker* (Englewood Cliff: Prentice-Hall, Inc., 1967), 103.

³Ibid., 125.

⁴Ibid., 112.

⁵Roger Burlingame, *General Billy Mitchell* (Westport: Greenwood Press, 1952), 115.

Chapter 4

Tactics of Concentration

The fighter pilots have to rove in the area allotted to them in any way they like, and when they spot an enemy they attack and shoot him down, anything else is rubbish.

—Baron Manfred von Richthofen

Formation Fighting

As major operations picked up on the western front, the Americans also began to mass their aircraft into formations. This was mainly in response to the Germans large offensives in the spring and summer of 1918. Their hope was to win the war before the fresh tide of American men and resources tipped the scales against them. The Americans were in charge of protecting part of the front along the Marne. Colonel Billy Mitchell was in charge of the air war in the American sector. He concentrated four squadrons of the 1st Pursuit Group and three squadrons of the I Corps Observation Group in the Chateau-Thierry area. On the other side of the front the Germans had amassed a large group of pursuit aircraft. Their strategy was to maintain air superiority over that part of the front in order to mask the build up for their attack. All told, the Germans had forty-six of the seventy-eight German fighter squadrons deployed in the sector. Their group included all three of the famous Flying Circuses. Compounding the fact that the 1st Pursuit Group was facing the best units of the German Air Force, but they also were doing it in

obsolescent aircraft. They were flying the Nieuports armed with jam-prone Marlin machine guns. The first couple of weeks were quite bloody for the American pursuit squadrons. Their earlier patrol tactics learned on the Toul front proved inadequate for this sector. The small three to five ship formations used in the less active sector at Toul simply could not cope with the large German formations. As the Second Battle of the Marne progressed further into July the 1st Pursuit Group performed all types of missions. Everything from low-level strafing, to escort of observation aircraft, to most importantly medium and high altitude offensive patrols intended to win and hold the skies against the Germans. During this time they learned that survival depended on large formations. They also coordinated their formations, using a high flight of aircraft to protect against surprise. The culmination of these mass formations were at St. Mihiel. For this campaign, Colonel Mitchell had a composite force of American, French, British, and Italian forces. It consisted of pursuit, observation, day bombardment, and night bombardment aircraft, making a total of 1,476. There were 30,000 officers and men to handle the planes, which were deployed on fourteen main flying fields.¹

Timing and Linkage

For the St. Mihiel operations, Mitchell had stationed his pursuit units around the flanks of the salient. The same was true of the observation units. This arrangement allowed the fighter aircraft to provide protection for the slower aircraft. The pursuit aircraft also were expected to maintain control of the air, strafe and bomb enemy troops, and prevent aerial observation by the enemy. Mitchell controlled the German operational tempo in the St. Mihiel salient by timing the attack of his airplanes. Several hundred

aircraft were scheduled to attack from the right making the Germans respond there, then several hundred would hit the left side, occupying the Germans there. These attacks took away the German initiative, blinding them to Mitchell's main attack which came from aircraft that had flown around both forces and attacked in the rear. The American drive successfully pushed back the German salient in two days. The ground battle produced over sixteen thousand prisoners and over 400 large guns were captured. Much of the success can be directly attributed to the fact that the American sector had air superiority. In the four days from September 12 to September 16, American aviation made 3,300 flights over the lines, were in the air over 4,000 hours, fired 30,000 rounds of machine gun ammunition and over 1,000 individual bomb attacks were made during which 75 tons of high explosives were dropped. Twelve enemy balloons and more than sixty enemy planes were destroyed, all of this done notwithstanding unfavorable weather.² The Air Service in conjunction with General Trenchard's bombers wrecked havoc with the German rear area and transportation. The British bombers attacked the German airdromes and aircraft on the ground. The Germans were forced to respond by repositioning aircraft from other sectors to St. Mihiel. The result was many large scale battles in the air.

Two weeks later Billy Mitchell, soon to be promoted to Brigadier general, began the Meuse-Argonne campaign. This was to be the final campaign of World War I. Although he had a slightly smaller force to work with, only about 800 aircraft. He still concentrated his aircraft and linked the different types of missions to support the overall air plan. He also used some new approaches during this campaign. In order to make his pursuit forces more quickly available to the advancing American ground forces, he established forward alert fields for the aircraft just behind the lines. The aircraft were fitted with bomb racks

and carried two twenty-five-pound bombs to more effectively harass the German infantry. To cope with German attack planes, Mitchell organized a special force of low flying pursuit planes. These low-flying patrols were made up of five planes each and were assigned six miles of front. They would fly at low altitude, usually under 500 feet. They would use friendly antiaircraft fire to spot enemy aircraft in their zone. These patrols proved quite successful in stopping German attacks on the ground forces. These patrols could also be called on to strafe enemy soldiers and knock down observation balloons. The principle of concentration that had been tried at St. Mihiel and proved so successful also worked again in the Meuse-Argonne campaign. Instead of parcelling out his forces to the divisions and corps. He used concentration of forces for single blows at the enemy's weaknesses, allowing him to again dictate the operations tempo. This increased the effectiveness of the American air forces and established a precedence for the future.

Notes

¹William Mitchell, *Memoirs of World War I* (New York: Random House, 1960), 238.

²Isaac D. Levine, *Mitchell Pioneer of Air Power*, (New York: Duell, Sloan and Pearce, 1958), 135.

Chapter 5

Conclusions

Few people outside of the air fraternity itself know or understand the dangers that there men face; the lives that they lead and how they actually act when in the air....No one can explain these things except the airman themselves.

—Brig. General William “Billy” Mitchell

Because of its late entry into World War I, the American Air Service did relatively little pioneering in the area of air combat. The Americans followed the combat procedures of its more experienced allies or emulated the ideas of their German adversaries. When World War I is viewed in retrospect, it can be considered a transitional phase in the development of the aircraft as an air weapon. Aerial tactics were expanded from mere reconnaissance and observation to more complex field operations in support of land and sea forces. The first air war was a great stimulus for the improvement of aircraft, it also addressed the need for standardized training procedures for airman.

When the war ended on 11 November 1918, the total Air Service strength stood at approximately 20,000 officers and 175,000 enlisted men. Of that number only 6,861 officers and 51,229 men had been deployed to Europe. During the brief participation in the fighting, only forty-five American air squadrons and 23 balloon companies saw actual combat. They flew 35,000 hours over the lines, staged 150 separate air raids, dropping 275,000 pounds of bombs. American fliers were credited with the destruction of 776

enemy planes (See appendix B, page 29) and 72 enemy balloons.¹ In the performance of these combat and support duties, the Air Service lost 290 planes and 37 balloons. The kill ratio was quite favorable to the Americans. It equates to 2.7 to 1 for aircraft and 1.9 to 1 for balloons.² Their statistics are quite good when considering the brief amount of time the American forces were in combat.

As a combat force the Americans came a long way from their auspicious beginnings in April of 1918. At that time, they had a single observation unit and two pursuit units flying unarmed Nieuports. They had the benefits of flying in a fairly quiet sector, Toul, and had a fairly standard training program. It's true that other countries helped with our training, but the Air Service also benefited from the fact that exposure to these different environments allowed for the optimization of training procedures. They also benefited immeasurably from the fact that combat veterans like Raoul Lufbery assisted in their training. This improved flying skills and combat procedures before being thrown into those first combat sorties. In July and August, they were matched against some of the best Jagdstaffeln in the German Air Force when fighting around Chateau-Thierry and the Marne. From this bloody experience emerged some very capable leaders out of the survivors of these battles. It was the veterans along with their lead-by-example style that helped to jell the still expanding American squadrons. Their presence along with the use of large formations provided stability for the Army Air Service during the big offensives.

Billy Mitchell adapted the large formation tactics during the Marne campaign to make American forces more effective. He instituted the use of timing and linkage in concert with large formations. This in effect dictated the operation's tempo to the German Air Force, allowing the Allied forces to shape the air arena and to maintain the initiative on

their terms. It was a subtle change to air operations, but it had wide ranging impact on air operations.

For the most part, the new American force based their operations on those of its more experienced allies. They were noted for innovations in the area of balloon busting, low-level pursuit, and forward alert fields. It must also be remembered that air power did not win the first world war. It played a relatively small role, but its lessons demonstrated the potential it could play in future conflicts. The seeds were sown in many military and political leaders of its potential. The bottom line is that aerial combat in World War I produced more than a new pattern of warfare and improved aircraft. It also provided a legacy of gallant men from the flaming conflict. Individuals such as Frank Luke, Eddie Rickenbacker, Raoul Lufbery, Billy Bishop, Mickey Mannock, Baron von Richthofen, Oswald Boelcke, and Max Immelmann. Men of valor who fought in Europe's hostile skies and captured the imaginations of generations still to come.

Notes

¹ “Victories and Casualties” *Gourell Histories* (AS AEF, M, XXXVIII), 3.

²James J. Hudson, *Hostile Skies*, (Syracuse: Syracuse University Press, 1996), 299.

Appendix A

The following is extracted from the information Professor Johannes Werner used in the preparation of the book, "Knight of Germany."

Dicta Boelcke

1. Try to secure advantages before attacking. If possible, keep the sun behind you.
2. Always carry through an attack when you have started it.
3. Fire only at close range, and only when your opponent is properly in your sights.
4. Always keep your eye on your opponent, and never let yourself be deceived by ruses.
5. In any form of attack it is essential to assail your opponent from behind.
6. If your opponent dives on you, do not try to evade his onslaught, but fly to meet it.
7. When over the enemy's lines never forget your own line of retreat.
8. For the Staffel: attack on principle in groups of four or six. When the fight breaks up into a series of single combats, take care that several do not go for one opponent.

Appendix B

Planes Destroyed by Air Service Pursuit Squadrons and Confirmed Victories of Individual Pilots

Squadron	Squadron Victories	Victories by Individual Pilots
94th	70	84
148th	64	70
27th	54	79
95th	48	70
22nd	42	57
17th	39	43
139th	34	74
103rd	32	43
93rd	32	43
147th	31	63
13th	28	59
49th	25	36
28th	14	30
213th	12	20
141st	2	6
	526	777

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